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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,438	11/20/2003	Wolfgang Rein	9101.00005	9834

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TROY, MI 48084

EXAMINER

MCMAHON, MARGUERITE J

ART UNIT	PAPER NUMBER
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3747

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/718,438

Applicant(s)

REIN ET AL.

Examiner

Marguerite J. McMahon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4-8, 11-13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457). Note a piston 2, connecting rod 3, and a piston pin 1a having a smoothly profiled outer circumference that is substantially circular in cross section with a larger diameter at the distal ends than at the center portion, which tapers gradually from the distal ends to the center portion. JP2-100821 shows everything except the end of the connecting rod aligned with the piston bore including a phosphatized coating that is adapted to facilitate relative angular movement between the bore extending through the connecting rod and the outer circumference of the piston pin. Hart et al teach that it is old in the art to provide a phosphatized coating on at least one of the running surfaces of the wrist pin, connecting rod bore and piston pin bores (see abstract and column 2, lines 47-60). It would have been obvious to one having ordinary skill in the art to modify JP2-100821 by providing a phosphatized coating on the inside surface of the connecting rod bore and piston pin bore and/or the outside surface of the piston pin in lieu of a conventional bushing usually pressed into the connecting rod bore, **in order provide the necessary tribological properties therebetween, more simply and inexpensively.** In addition,

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Hart et al show a slightly different range of thickness of phosphate coating than applicant's, i.e. applicant claims a range of 2 to 8 micrometers, and Hart et al show an overlapping range of 8 to 15 micrometers. According to MPEP 2144.05 (1), a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties.

Claims 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457) as applied to claims 1, 2, 4-8, 11-13, 15, and 16 above, and further in view of Fangman (3,479,929). JP2-100821 in view of Hart et al show everything except employing a tapering connecting rod and bore housing. Fangman teaches that it is old in the art to provide a tapering connecting rod and bore housing. It would have been obvious to one having ordinary skill in the art to modify Loughlin in view of Hart by providing a tapering connecting rod and bore housing, **in order to reduce the mass of the rod, while maintaining surface area connection between piston and rod (see column 1, lines 19-25 of Fangman).**

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457) as applied to claims 1, 2, 4-8, 11-13, 15, and 16 above, and further in view of DeBiasse (4,984,544). JP2-100821 in view of Hart teach everything except providing side relief channels along the inner circumference of the pin bore. DeBiasse teaches that it is old in the art to provide side relief channels 68 along the inner circumference of the pin bore. It would have been obvious to one having ordinary skill in the art to modify JP2-100821 in view of Hart et al by providing

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side relief channels, **in order to accumulate lubricating oil to lubricate between the surfaces of the pin and bore.**

Claims 3, 9, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457) as applied to claims 1, 2, 4-8, 11-13, 15, and 16 above, and further in view of Lindstrom (5,039,285). JP2-100821 in view of Hart et al show everything except an internal gallery between the first and second ends of the connecting rod to direct lubricant between said first and second ends. Lindstrom teaches that it is old in the art to provide an internal gallery 66 between first and second ends of the connecting rod 42 to direct lubricant between said first and second ends. It would have been obvious to one having ordinary skill in the art to modify JP2-100821 in view of Hart et al by employing an internal gallery in the connecting rod **to facilitate lubrication of the piston pin and crankshaft.**

Response to Arguments

Applicant's arguments filed 7/29/05 have been fully considered but they are not persuasive.

With respect to the rejection of claims 1, 2, 4-8, 11-13, 15, and 16, which are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457), Applicant argues that the examiner has provided an unconvincing motivation to combine references, because "the alleged motivation supplied by the examiner cannot be found in the references and is simply a conclusory interpretation of what the references teach" and "the examiner has not cited any language from JP2-100821 that would suggest motivation to combine it with Hart et al." The examiner has

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cited evidence from the Hart et al reference as to the motivation to combine it with the primary Japanese reference as follows: JP2-100821 utilizes a bushing for the piston pin, as is conventional in the art, but does not rely upon the bushing for patentability.

The Hart et al reference teaches the advantage of utilizing a phosphatized coating as a means of eliminating the bushing and notes the following:

The coating absorbs and traps lubricating oil and develops a stiff lubricant squeeze film between the mating running surfaces of the connecting rod and wrist pin to provide the necessary tribological properties, eliminating the need for a conventional Cu-based bushing.

The invention has the further advantage of minimizing or eliminating the concern over bushing wear from increased levels of abrasive contaminants. The steel pins and connecting rods along with the coating are resistant to wear from such contaminants.

By eliminating the bushing, a cost savings is also recognized in both the material and labor of installation along with a reduction in the weight of the piston assembly.

So, as applicant can readily see, there is ample motivation to combine references, since the Japanese reference would benefit by the ability to eliminate the bushing, as explained above.

Applicant further maintains that the examiner "simply concludes that the problem addressed by JP2-10082 is the same as the problem addressed by Hart et al (i.e. reducing mass by eliminated a bushing). Yet, JP2-100821 teaches a bushing and multi-part pin, both of which add mass and maintain conventionally known lubrication characteristics." The examiner finds that it is reasonable to conclude that mass reduction is advantageous in most engine applications, since this is well known. So, the ability of the Hart et al reference to provide a

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solution to this problem that could be utilized by JP2-100821 to its advantage is a reasonable motivation to combine the Hart et al reference with JP2-100821.

Applicant further maintains that since JP2-100821 discloses a multi-part pin and employs a bushing that is cannot be modified by the Hart et al reference. The examiner fails to see the logic behind this assertion, since the motivation to modify JP2-100821 by employing the manganese phosphate coating in lieu of the bushing, as shown by the Hart et al reference, has been well established.

Applicant further argues that the coating thickness shown by the Hart et al reference is excessive and therefore does not have the same properties as the coating thickness between 2 and less than 8 microns. The phosphatized coating of Hart et al has “a depth or thickness of **about** 8.0 to 15 micrometers” (emphasis added, see column 3, lines 9-12 of Hart et al). Hart et al does not argue the importance of a thickness between 8.0 to 15.0 micrometers, as suggested by applicant. As noted in the above rejection, according to MPEP 2144.05 (1), a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. The examiner maintains that even though applicant has amended the claims by adjusting the range to 2 to less than 8 micrometers to avoid overlapping with the range suggested by Hart et al, that the depth or thickness of the coating could be adjusted to suit the application involved, such as, for instance utilizing a smaller coating with a smaller piston-engine or a larger coating with a larger piston-engine. Also, please note the citation of prior art in the first Office Action, which included the references of Uchara et al, which utilizes a thickness of phosphate coating of 2 to 8 micrometers (see abstract) and Kagohara et al, which utilizes a thickness of

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phosphate coating of 2 to 30 micrometers (see column 2, lines 50-60), as further evidence that this particular coating depth does not provide a patentable distinction over the prior art.

Applicant further suggests that since tolerances between the piston pin and the pin bore are critical, that the specific thickness range is also critical, and that it would not be practical to adjust the thickness range relative to the size of the engine. The examiner finds this unconvincing. However, even if it were true, the closeness of the ranges suggested by the reference and the applicant would override this consideration.

Applicant further argues that the coating range of between two and less than eight microns is in contrast to the teachings of Hart et al because this range results in less vibration, engine noise or premature wear. The examiner still finds this reasoning unconvincing, as it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272,205 USPQ 215 (CCPA 1980). Thus, discovering the optimum thickness of a coating is an element that would be considered to be within the purview of one of ordinary skill in the art.

Applicant further argues that neither Hart et al nor JP2-100821 teach the use of a smoothly profiled piston pin that is substantially circular in cross section with a larger diameter at its distal ends than at its center portion and that tapers gradually from the distal ends to the center portion. This is untrue. Both references teach the use of a smoothly profiled piston pin that is substantially circular in cross section, as is completely conventional in the art, and in addition, the JP2-100821 reference teaches that the pin has a larger diameter at its distal ends than at its center portion and that tapers gradually from the distal ends to the center portion.

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Applicant further argues that the elements shown by the Lindstrom '285 bears no relation to the claimed invention bears no relation to the combination of a profiled piston pin and a bushingless connecting rod including a phosphatized coating." The examiner is uncertain as to the thrust of this argument, but will try to respond. The Lindstrom reference shows an engine having a piston with a piston pin and connecting rod and an internal gallery 66 between first and second ends of the connecting rod 42 to direct lubricant between said first and second ends. It would have been obvious to one having ordinary skill in the art to modify JP2-100821 in view of Hart et al by employing an internal gallery in the connecting rod **to facilitate lubrication of the piston pin and crankshaft.**

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marguerite J. McMahon whose telephone number is 703-308-1956. The examiner can normally be reached on flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yuen Henry can be reached on 703-308-1946. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


MARGUERITE MCMAHON
PRIMARY EXAMINER